UCRL-JC-123515 Abs

5th International Colloquium on X-Ray Lasers
June 10-14, 1996
Lund, Sweden

High resolution two-dimensional near field images of neon-like soft x-ray lasers

J. C. Moreno, J. Nilsen

Lawrence Livermore National Laboratory
P.O. Box 808, L-15, Livermore, CA 94550

Y. Li, P. Lu, E. E. Fill

Max-Planck-Institut fur Quantenoptik
D-85748, Garching, Germany

We discuss high resolution two-dimensional near-field images of the neon-like nickel and germanium x-ray laser. The Asterix iodine laser, using a prepulse 5.23 ns before the main pulse, was used to irradiate slab targets. Our imaging diagnostic consisted of a concave multilayer mirror that imaged the x-ray laser line (with a magnification of ten) onto a backside illuminated x-ray CCD detector. The proper choice of filtering was essential to decrease the background emission and scattered light. A 25 μm thick wire positioned at the end of the target provided a spatial fiducial. A great deal of structure was observed in the near field images, particularly in the J=0-1 emission. We observed a large difference in the spatial dependence of the J=0-1 and J=2-1 lines of germanium, with the J=2-1 emission peaking farther away from the original target surface. The prepulse level was varied and observed to have a significant effect on the spatial dependence of the germanium and nickel laser lines. A larger prepulse moved the peak emission farther away from the target surface. These measurements are generally consistent with hydrodynamic simulations coupled with atomic kinetics.

This work was performed under the auspices of the U.S. Department of Energy by Lawrence Livermore National Laboratory under contract No. W-7405-ENG-48